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ABSTRACT

This set of materials is designed to enhance the effectiveness of teachers' uses of structuring statements and questioning strategies. The material is presented as a series of self-directed workshops focusing on teacher-initiated verbal directions and questioning strategies and how these can be used strategically to enhance students' thinking. Topics of the workshops are: (1) defining types of teacher-initiated structuring statements and questions; (2) identifying types of written statements and questions; (3) making a profile of scored statements and questions; (4) classifying statements and questions from a transcript (2 parts); (5) classifying questions from an audiotape (2 parts); (6) assessing statement or questioning strategies; (7) matching strategies to instructional profiles; (8) matching goals to questions; (9) classifying statements or questions using your own audio- or video-tape; (10) sequencing questions strategically; (11) using statements and questions strategically; (12) matching types of statements and questions to learning processes; (13) practicing statement and questioning strategies; (14) identifying types of student responses to statements and questions; (15) classifying student responses from transcripts; and (16) analyzing the length of student responses to teacher questions. A review of research on the use of questions in instruction is included as well as a bibliography and questioning strategies assessment sheets. (JD)

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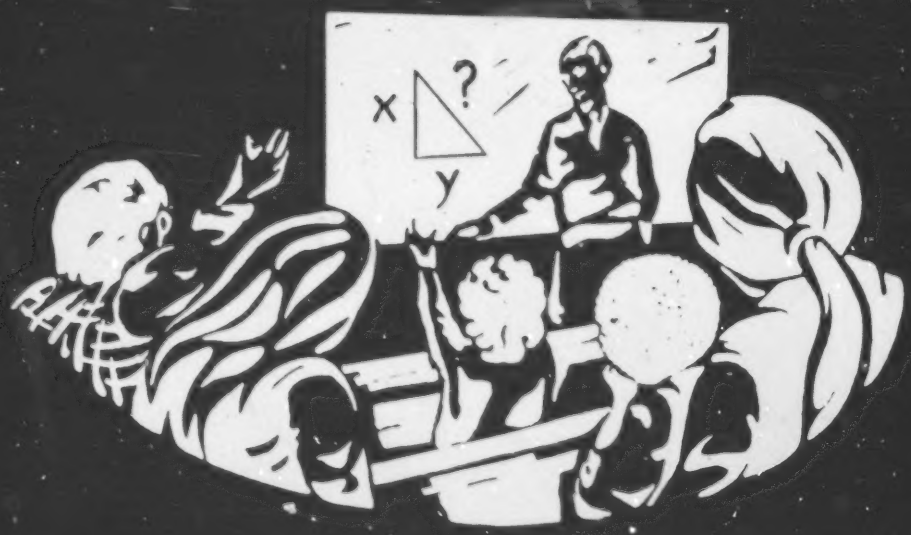

Teacher-initiated statements and questions

SP024474

LEARNING ABOUT....SERIES

Series developed by

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Research into Practice Publications
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The "Learning About...Series" is being developed through the resources of the Department of Education, University of California, Berkeley. The research and development dimensions are longitudinal and involve a breadth of research and field personnel.

The major objectives of this series are to assist beginning and experienced teachers in becoming regular evaluators of their own instruction and to transfer research knowledge into practical, effective, and cohesive forms. The series is comprised of three interwoven themes: The Learner, Instruction, and Subject Areas. Users of the series are taught to use materials and techniques that help assess stages of intellectual development in students, to identify and prescribe learning activities commensurate with their students' intellectual development, and to use techniques for improving and assessing their interactions with students. Information concerning this and other publications can be obtained through the Professional Development and Applied Research Center, Department of Education, University of California, Berkeley 94720.

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learning about instruction: teacher-initiated verbal directions and eliciting questions

A PERSONAL WORKSHOP

by

Lawrence F. Lowery

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Teacher-initiated Structuring Statements and Questions has evolved over a period of eight years of development, field testing, and refinement. These materials originated from an interest in types of questions and their functions in the instructional process.

Initial materials were derived from a review of the research literature on this topic, followed by field testing with both beginning student teachers and experienced teachers who were participating in a teacher education program at UC Berkeley, as well as with others across the the country. Our experience with these teachers and with a research study of verbal interaction in classrooms—using varying types of structure—led to a series of category redefinitions, revisions, and development of additional materials which allow teachers to explore the effects of their uses of these verbal structuring strategies on their pupils' responses.

What has emerged is a set of materials based on both research and practical application with classroom teachers which is designed to enhance the effectiveness of teachers' uses of structuring statements and questioning strategies as one basic component of the instructional process.

This self-directed, personal workshop focuses upon teacher-initiated verbal directions and eliciting questions and how these can be used strategically to enhance students' thinking. Although you will learn many ideas and develop various skills from experiencing this workshop, three major goals are identified below.

As a result of this workshop, you will be able to:

1. identify and classify types of directive statements and eliciting questions in terms of their potential effects upon students' thinking.
2. use each type of statement and question strategically so as to facilitate the development of students' thinking processes.
3. assess yourself in terms of knowledge and ability related to using statements and questions strategically.

This workshop is self-instructive. It utilizes written materials, audiotapes, videotapes, and students in your classroom.

The effective use of directions or questions is but one of several instructional processes which can help learning to take place. Directive statements and eliciting questions can be initiated and controlled by the teacher (as in most classrooms) or can be initiated by the students (as in inquiry development programs). This book considers only the teacher-initiated and controlled statements and questions.

Research indicates that teacher-initiated statements and questions can be valuable in enabling students to learn and to develop ways of learning. When properly phrased and timed, statements and questions can motivate and sustain interests, develop and modify attitudes, stimulate thinking, facilitate fresh ways to deal with ideas and problems, and elicit certain cognitive processes such as recalling, inductive and deductive reasoning, and speculating.

Part of the art of instruction is to select and use statements and questions that directly affect the thinking skills of students while avoiding statements and questions that are trivial, misleading, confusing, or manipulative.

WIZARD OF ID *-By Parker and Hart*

AFTER MY SPEECH, WE WILL HAVE A QUESTION AND ANSWER PERIOD FOR THE PRESS
HOO RAY
YEA
IT'S ABOUT TIME
CLAP CLAP CLAP CLAP
CLAP CLAP CLAP CLAP
CLAP CLAP CLAP CLAP
IF YOU FAIL TO ANSWER THE QUESTIONS, I WILL GIVE THE SPEECH AGAIN.

By permission of John Hart & Field Enterprises, Inc.

This personal workshop will help you improve the effectiveness of your directive statements and questions through insights into the ways you can actually use them strategically with your students. Briefly, the method used in this workshop is to introduce you to several types of statements and questions, provide different ways for you to develop and practice your ability to identify each type, then show you how to draw simple maps or profiles that somewhat objectively describe your own strategies with students.

Begin with Workshop A in the next section, and continue through the subsequent self-instructional workshops at your own pace.

WORKSHOP A
defining types of teacher-initiated directive statements and questions

The purpose of this self-workshop is to provide definitions for the different types of statements and questions that teachers might use in instructional situations. At the end of this workshop, you should be able to recall the basic types.

There is a great variety among teacher-initiated directive statements and eliciting questions. Some are narrow— they structure the learning situation toward a planned, specific goal. Some are broad— they structure the learning situation toward unplanned, divergent outcomes. Others are independent of the learning situation in that they are not directly related to the purposes of the instruction.

Often questions are used in the place of statements. Teachers sometimes feel statements are very authoritarian and to rephrase a statement as a question "softens" the command (e.g., "Close the door" vs. "Will you close the door?").

Your skill at using directive statements and questions depends upon your knowledge of a few basically different types that might be used in instructional settings. These types are defined on the following pages.

1. Narrow Statements and Questions

A narrow statement or question seeks a certain, predictable response planned by the teacher. A specific "correct" response or set of responses is anticipated. When a teacher initiates a narrow statement or question, the teacher is hoping for a particular convergent outcome. Usually the teacher has an answer in mind and is seeking a congruent answer by the student.

There are two types of narrow statements and questions: confirming and integrating. Both types seek predictable convergent responses; however, the thinking processes required by the student in responding to these two types differ. The confirming type requires the student to recall or recognize information. The integrating type requires the student to synthesize information in a particular direction planned by the teacher.

a. Confirming

Confirming statements and questions require the student to *remember* information or *recognize* information that is readily at hand. The teacher has a particular response in mind and is seeking confirmation between what the teacher has in mind and the student's response. A single response or limited set of specific predictable responses is sought.

Examples:

Statements	*Questions*
"Tell me when the steam engine was invented."	"When was the steam engine invented?"
"Name the largest city in California."	"What is the largest city in California?"
"Explain what we found out about that yesterday."	"What did we find out about that yesterday?"
"Identify this animal."	"What kind of animal is this?"
"Look at the chart and find how many naturally found elements there are."	"According to the chart, how many natural elements have been found on earth?"
"Tell me what national parks you've visited."	"What national parks have you visited?"

Confirming statements or questions are useful if you want the student to recall a fact, define a term, identify something, or give a response that has been learned by rote memory. It is expected that the student's response will match the response you would give to the same statement or question. Who, what, where, when, how much, how many, and the like are confirming questions. "Tell," "explain," "name," and "identify" can begin confirming statements. They are used when the student is told to recall the information or recognize it when the information is at hand.

Responses to confirming statements or questions will often be one word or short answers. To respond, the student must be able to remember or recognize information, and the teacher is in a position to confirm or not confirm the response.

As part of a strategy, confirming statements or questions can be used to reestablish what has gone on in a previous experience or to establish a base of information upon which new knowledge will depend. Confirming is generally effective for the following purposes: (1) at the beginning of a lesson to "set the stage," (2) during the lesson to focus on or expand attention to previously learned information which needs to be considered, and (3) at the end of a lesson to bring out or reemphasize key points and/or bring about closure on an idea or topic. Confirming is also generally used in "drill" lessons.

Examples of strategies using confirming statements and questions:

(1) Confirming statements and questions used to set the stage:

Statements	*Questions*
"Remind us about what happened in the story up to this point."	"What has happened in the story as far as we got yesterday?"
"Tell what you know about the '+' sign."	"What do you remember about a '+' sign?"

(2) Confirming statements and questions used to focus attention on previously learned information:

Statements	*Questions*
"Explain what you do when the upper number is smaller than the lower number."	"What is it that you must remember to do when the upper number is smaller than the lower one?"
"Give the rule for two vowels together."	"What is the rule for when you have two vowels together?"

(3) Confirming statements and questions used to summarize key points:

Statements	*Questions*
"Show how we categorized these shapes."	"What were the different ways we categorized the shapes in our discussion today?"
"State the three things to remember when writing a letter in the proper form."	"What are the three things we need to remember when we write a letter in the proper form?"

b. Integrating

Integrating statements or questions require the student to *synthesize* information *in a particular direction* planned by the teacher.

A limited set of specific predictable replies are expected in response to narrow integrating statements or questions. Note that these replies are in response to statements or questions which include clues as to what the anticipated response is or cues as to appropriate methods of obtaining the response.

Examples:

Statements	*Questions*
"Tell how this idea explains photosynthesis."	"How does this give you an idea about how the plant carries on the process of photosynthesis?"
"Use your knowledge about leather and moisture to explain the soil conditions at this excavation site."	"If leather rots quickly in moist ground, what do you conclude about the soil conditions when scientists find remains of leather footwear in an excavation site?"
"Compare Spanish and Italian languages in terms of similarities."	"In what way is the Spanish language like the Italian language?"
"Explain the electrical charges of these balloons."	"What can you say about the charges of these two electrically charged balloons which are attracting each other?"

Integrating statements and questions are useful if you want the student to compare, contrast, associate, explain, state relationships, or arrive at particular conclusions. Who, what, where, when, how much, how many, and the like can be integrating questions. "Compare," "tell," and "explain" can begin integrating statements. They are used when the information is not available, and the response must be derived through clues or a process of analysis and induction.

To respond to integrating statements or questions, the student must know certain facts, be able to associate and put them together, and give an explanation in his/her own words.

As part of strategy, integrating can be used to guide the student toward a particular idea that you have in mind but that you want the student to develop in his/her own terms. Specifically, they can be used (1) to extend the student's ideas in a planned direction or (2) to obtain further clarification of the ideas.

Note that with this strategy, it is possible for the student to synthesize the information in new and unanticipated ways. In using this type of statement or questioning strategy, the teacher must be prepared to accept unplanned but plausible alternative responses from students.

Examples of strategies using integrating statements and questions:

(1) Integrating statements and questions used to extend a student's ideas:

Statements	*Questions*
"List more items needed to build the cage."	"And what else would you need in order to build the cage?"
"Tell where you can get the materials."	"Where will you get the materials?"

(2) Integrating statements and questions used to request clarification of a student's response:

Statements	*Questions*
"Explain what you mean by 'deeper.'"	"What do you mean by 'deeper?'"
"Tell why you think that bear couldn't have done it."	"Why do you say that a bear couldn't have done it?"

2. Broad Statements and Questions

A broad statement or question seeks a variety of acceptable, although generally unpredictable, responses. When a teacher initiates a broad statement or question, the teacher is hoping for unplanned, divergent outcomes.

There are three types of broad statements and questions: open-ended, valuing, and feeling.

All three types require the student to utilize thinking processes which synthesize information or ideas in ways which are unique to the individual (rather than planned by the teacher). The three types differ, however, in terms of the degree to which each centers on cognitive or affective matters. Open-ended statements and questions focus on material that is largely cognitive. Feeling statements and questions are within the affective domain. And valuing statements and questions can be seen as being influenced by both cognitive and affective components.

a. Open-ended

Open-ended statements and questions allow the student to synthesize and explore his/her own ideas freely in the student's own terms, without restrictions and with only minimal guidance by the teacher. A variety of unplanned, divergent outcomes— generally cognitive in nature— are sought.

Examples:

Statements	*Questions*
"Give another explanation."	"What might another explanation (or answer) be?"
"Give another possible resolution to the problem."	"What could be done to resolve this problem?"
"List other factors that could be involved."	"What other factors might be involved?"
"Predict what will happen."	"What prediction can you make about what is going to happen?"

Such statements and questions are useful if you want to encourage the student to synthesize ideas, hypothesize and develop a meaningful resolution, deduce and predict, or organize elements into a fresh pattern that was not clearly recognized before.

As part of a strategy, open-ended statements and questions can extend the student's ideas and expand the field of study being pursued or structure it without indicating the nature of the response(s) or the appropriate method for obtaining the resolution(s).

Statements and questions can be classified as open-ended only if the teacher is not seeking a specific planned response.

b. Valuing

Valuing statements and questions require the student to synthesize information in order to come to the student's own judgmment or evaluation. When a teacher initiates a valuing statement or question, the teacher wants the student to express his/her own preferences and opinions.

Examples:

Statements	*Questions*
"Tell why you like the first poem better than the second poem."	"What makes you like the first poem better than the second poem?"
"Explain why you think this is the best order for arranging these objects."	"Why do you say this is the best order for arranging these objects?"
"Give reasons for why you would like or not like to live in England."	"Why would you like or not like to live in England?"
"Tell what you think about the accuracy of the author's conclusions."	"What do you think about the accuracy of the author's conclusions?"
"State your opinion of the government's decision to...."	"What is your opinion of the government's decision to....?"

Such statements and questions are useful if you want the student to organize knowledge, formulate an opinion, or take a self-selected position. Valuing statements and questions might require justification of a choice, defense of a position, or evidence for a judgment.

As part of a strategy, valuing is useful in building an atmosphere in which students recognize that individual opinions are important and that it is acceptable for individuals to hold differing opinions.

c. Feeling

Feeling statements and questions allow the student to express his/her own feeling and emotions of a purely affective nature.* When a teacher initiates such statements or questions, a variety of unpredictable responses are sought.

*Note that the word "feeling" is sometimes misleadingly used to imply thoughts or opinions. For example, when people ask, "Do you feel we ought to inform his parents?" or "How do you feel about nuclear energy?", they are generally asking for your opinion rather than your emotional reactions. When "feeling" is used in this sense, it does not refer to the affective domain and therefore would not be considered a feeling statement or question.

Examples:

Statements	*Questions*
"List what kinds of things make you happy."	"What kinds of things make you happy?"
"Tell how you felt when you saw the hunter kill the bird."	"How did you feel when you saw the hunter kill the bird?"
"Tell how you feel when someone shouts at you."	"How does it make you feel when someone shouts at you?"
"Predict how you'll feel if the experiment works."	"How do you think you'll feel if the experiment comes out the way you predict?"
"Tell what you think he felt when he learned his dog was hit."	"What do you think he was feeling when he learned his dog was hit?"

Such statements and questions are useful if you want the student to be able to share feelings or become aware of his/her own feelings or the feelings of others.

Note that in order to respond to this type of statement or question, the student must sense that the environment is one of trust, one where feelings will be accepted by others.

As part of a strategy, feeling statements and questions and the acceptance of students' feeling responses can help build an atmosphere in which the affective sphere is valued as a natural part of human functioning.

3. Non-instructional Statements and Questions

Statements and questions that are not directly related to the topic of instruction are often used in classrooms. Three types of non-instructional statements and questions can be identified: rhetorical, procedural, and behavioral. These three types are only briefly described below because the primary focus in this book is on the types of narrow and broad instructional statements and questions elaborated on the preceding pages.

a. Rhetorical

Rhetorical questions are actually statements. They are used to reinforce a point, to provide an emphasis, or to heighten student interest.

Examples:

Statement-Question

"Mammals can be identified by the hair or fur on their bodies, can't they?"

"That is true for most of us, isn't it?"

Any question can function rhetorically when the teacher supplies the answer or when the question is not followed by enough time for students to respond.

b. Procedural

Procedural statements and questions are used to organize the lesson, to prepare for transitions, and for routine matters. They serve to keep things running smoothly and are sometimes used to provide directions rather than to elicit a response from the student.

Examples:

Statements	*Questions*
"Please turn to page 36."	"Will you please turn to page 36?"
"Raise your hand if you can't hear."	"Can everyone hear?"
"Tell me if you need more time to finish the assignment."	"Who needs more time to finish the assignment?"
"Please raise your hand if you wish to speak."	"Will you please raise your hand if you wish to speak?"

c. Behavioral

Behavioral statements and questions serve to control student behavior that is disruptive or unacceptable in the classroom situation. Sometimes these are used to redirect the student's attention to the task at hand.

Examples:

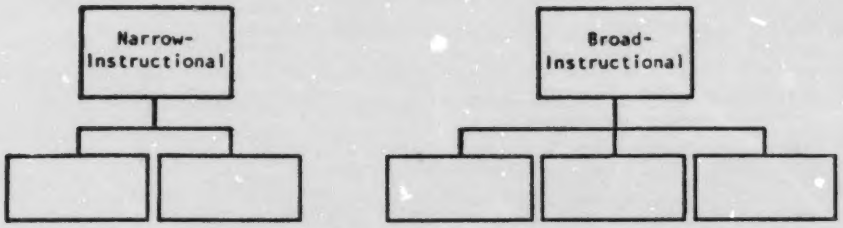
Statements	*Questions*
"John, go back to your seat now and finish your math."	"John, will you please go back to your seat now and finish your math?" (In context of John wandering around the room.)
"Explain how the fight began."	"How did the fight begin?"
"Tell me why you took her pencil."	"Why did you take her pencil?"

For the major types of instructional statements and questions, the chart below the hierarchy summarizes the following information: (1) the thinking processes required, (2) the predictability of the outcomes, and (3) whether the domain is cognitive or affective.

Now fill in the blank boxes in the hierarchy of statements or questions shown below by recalling the basic types described on the previous pages.

See if you can also provide a definition for each of the boxes.

Types of Statements or Questions



Process	Memory Recognition	Synthesis	Synthesis	Synthesis	Synthesis
Outcome	Predicted	Predicted	Unpredictable	Unpredictable	Unpredictable
Domain	Cognitive	Cognitive	Cognitive	Cognitive Affective	Affective

WORKSHOP B
identifying types of written statements and questions

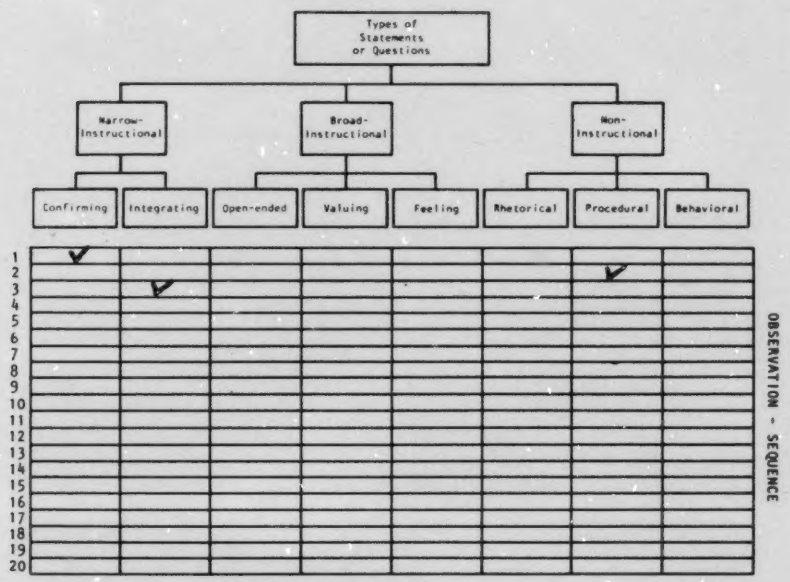
The purpose of this self-workshop is to provide you with the means to practice identifying statements and questions. Following this workshop, you will be able to identify and classify the types from listings of written statements and questions.

A matrix, like the one shown below, can be used to identify questions conveniently. This matrix will be used throughout this book. To indicate how it can be used, the following three examples have been scored on it.

1. "Which planet is closest to the sun?" (Confirming Question)

2. "Shall we look at our books to find the answer?" (Non-Instructional/Procedural Question)

3. "Now that you know about the crank, what do you think will happen if you turn the handle to the right?" (Integrating Question)



A practice set of written questions and a matrix are presented on the next two pages. A similar practice set of written statements follow. Try to identify the types of questions and mark them on the matrixes.

Although you can't detect inflections, you can identify the statements and questions at your own pace; thus, you will have time to think carefully about the different types.

Workshop Guideline

A strategy that you might find helpful when trying to identify and classify statements or questions is to decide first whether the statement or question is narrow, where the teacher has a particular response in mind; whether it is broad, where the teacher is seeking divergent responses; or whether it is or is not related to the instructional process.

Then, if it is a narrow statement or question, decide whether it is confirming or integrating by considering whether the thinking process required is memory or synthesis.

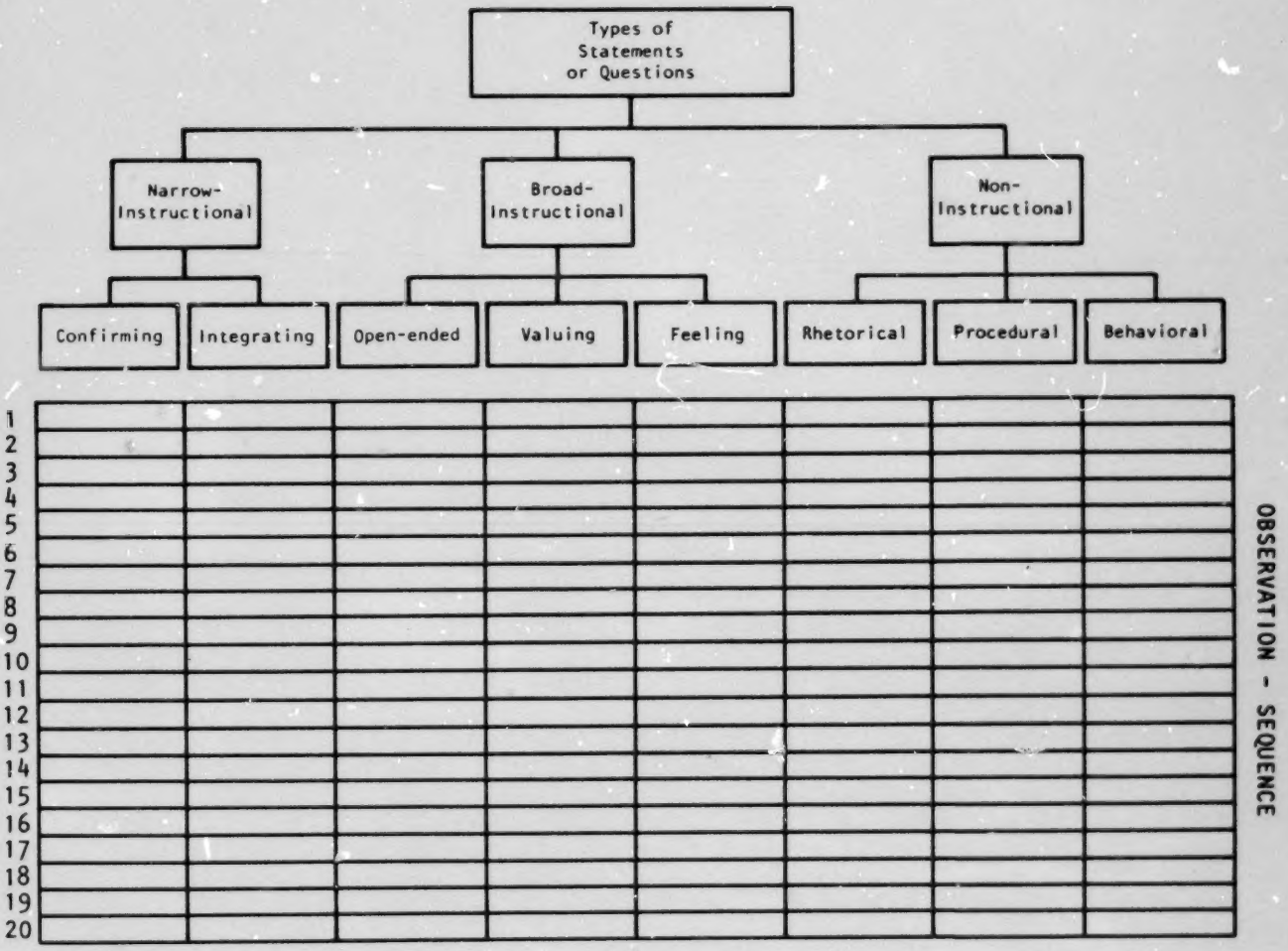
If the statement or question is broad, you may find it helpful to differentiate between open-ended, valuing, and feeling by considering whether it concerns the cognitive or affective domains.

Note that it is sometimes difficult to determine another teacher's intent. It will be easier to decide about your own statements or questions.

Practice Questions

1. "Is honesty important or not?"
2. "Who will close the window?"
3. "The word 'product' is the name given the answer to what kind of arithmetic problem?"
4. "If distance is increased between two masses, looking at the formula, what do you think will happen to the force?"
5. "A verb is a word that expresses action, right?"
6. "What could be done to solve the problem?"
7. "What do you like best about Thanksgiving?"
8. "Now let us think about the film we just saw. What are some of the similarities among different tribes' ceremonial behaviors after planting crops?"
9. "How did you feel when you weren't chosen?"
10. "Suppose you had been the girl in the story; what would you have done to help the old man?"
11. "What do we call this?"
12. "When you repeat this experiment, what things do you plan to do in order to make your results more accurate?"
13. "The shortcuts you have learned for multiplying by ten are useful, aren't they?"
14. "Which do you think is best to use?"
15. "What happens to the answer of a three-part multiplication problem like 21 x 53 x 46 when the numbers are placed in reverse order?"
16. "What are the names of the three branches of the Federal Government?"
17. "Here is a map showing only the transportation routes in a country. Where are the three most important cities in this country?"
18. "How much of the earth's surface is covered with water?"
19. "Which group wants to make its presentation first?"
20. "How might we find out?"

Practice Matrix

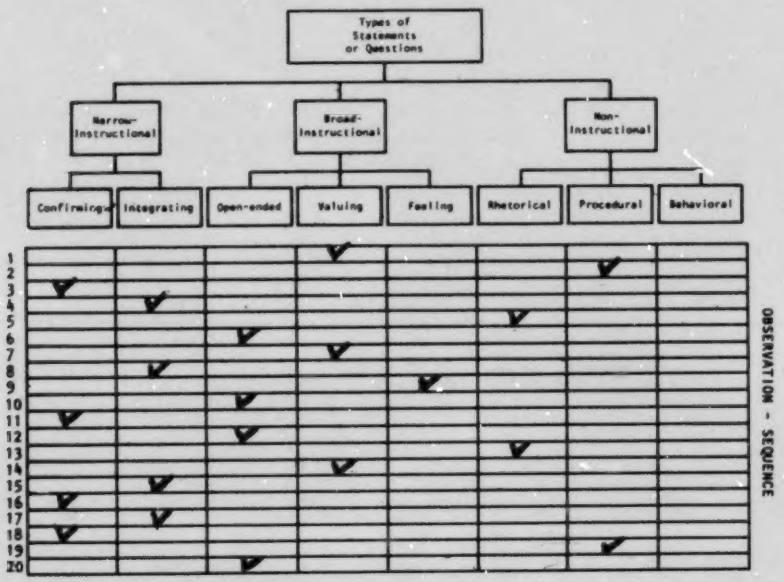


Now that you have identified and classified the written questions, you might like to see how someone else classified them. To find out, turn the page.

Analysis of Practice Questions

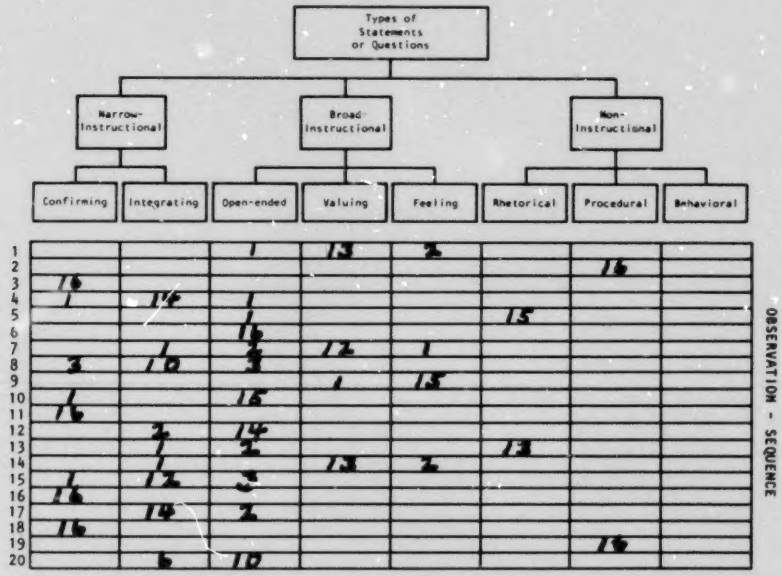
Here is how a sample of experienced teachers identified the set of written questions. The tallies represent 100% agreement among them. If the scoring raises some questions in your mind, please note them in the margins, then talk to a colleague about them.

1. Valuing. Asks for an opinion.
2. Non-instructional (Procedural). Deals with classroom management rather than with content of lesson.
3. Confirming. Asks students to recall part of a definition.
4. Integrating. Gives clues ("looking at the formula"). asks a student to analyze and arrive at a particular idea.
5. Non-instructional (Rhetorical). No answer expected.
6. Open-ended. Calls for free exploration of the problem.
7. Valuing. Asks student for (an affective) judgment.
8. Integrating. Asks student to analyze clues (scenes in the movie) and to develop particular ideas in his or her own terms.
9. Feeling. Asks for feeling.
10. Open-ended. Asks student to explore freely and come up with novel solutions to a problem.
11. Confirming. Asks student to recall the name of something.
12. Open-ended. Asks student to solve a problem; gives no clues.
13. Non-instructional (Rhetorical). No answer expected.
14. Valuing. Asks for a judgment.
15. Integrating. Expects student to arrive at a particular idea through analysis of clues.
16. Confirming. Asks for recall of facts.
17. Integrating. Asks for analysis of clues (from a map) to obtain a correct answer.
18. Confirming. Asks for recall.
19. Non-instructional (Procedural). Deals with classroom procedure rather than content of lesson.
20. Open-ended. Calls for free exploration. However, in context of discussion of best method, it could be considered integrating.



And here is how 16 beginning teachers identified the same set of written questions. The numerals in the matrix indicate the number of teachers who identified each question differently. For example, with question number four, one person identified it as Confirming, 14 persons identified it as Integrating, and one person as Open-ended.

The difference of opinion illustrates that uniform agreement is not expected but that general agreement occurs. This happens because the categories of questions are approximate and individual interpretations vary. The categories are intended to stimulate discussion and self-assessment rather than to represent a precision tool for sophisticated research.

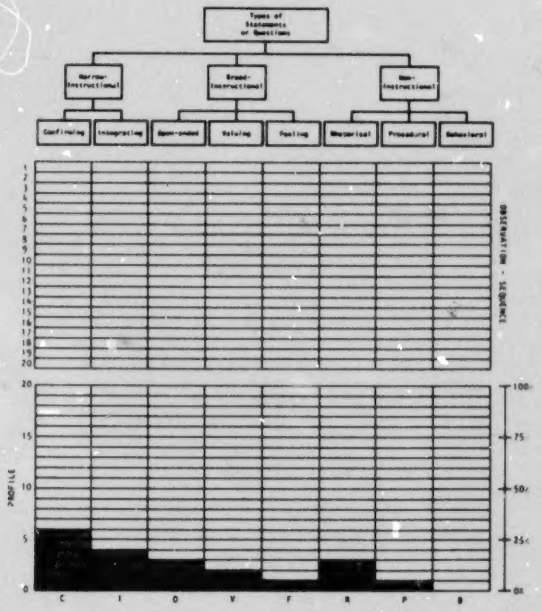


WORKSHOP C
making a profile of scored statements and questions

The purpose of this workshop is to provide you with a means for analyzing scored statements or questions statistically. After this workshop, you will be able to bar graph scored items and analyze them in terms of percentages.

One good way to organize the information from a matrix so that trends and patterns can be readily recognized is to make a profile in the form of a bar graph.

Added to the matrix with which you are already familiar is a form that can be used to construct such a profile conveniently. To use this, simply darken the corresponding number of spaces on the form. Note that when a sample interaction contains 20 statements or questions, you can read the percent of the total from the right side of the profile.



Use this form to practice constructing a profile of the questions you have just classified.

Here are some questions to ask yourself about the percentages on this form:

1. Were the sample statements or questions balanced among types or was one type used more than any other? How are these data interpreted?
2. How would the graph look if you wanted to have students express their feelings?
3. How would the graph look if you wanted to have students recall information they had studied?
4. What percentage of statements or questions were integrating? feeling?

WORKSHOP D
classifying statements and questions from a transcript (1)

The purpose of this workshop is to provide you with a means to practice identifying and classifying directive statements and questions from a transcript. Following this workshop, you will be able to identify and classify types of directive statements and questions contained in a written transcript.

The following is a transcript of verbal interactions taken in an imaginary classroom. A numeral is placed after each statement made by the imaginary teacher. Identify the numbered statements on one of the assessment sheets found at the back of this book, then tally the types on the graph to obtain a profile of the statements used.

Description of Setting From Which Transcript Was Made

Setting: 35 students arranged in rows facing teacher at front of room

Grade: Sixth

Topic: Social Studies unit on Mexico

Prior to the lesson, the students read about and researched information on one of the earliest civilizations that archeologists have found in Central Mexico. The teacher's goal for this part of the lesson was to have students recall factual information from their readings. The teacher intends to use this information to discuss what it would have been like to have lived in that civilization.

Beginning of Transcript

Teacher: *Please put your pencils down, put your spelling books away, and take out your social studies textbooks.* (1)

Class follows the teacher's directions.

Teacher: *Richard, tell us what page we were discussing yesterday.* (2)

Richard: *It was page 48.* (a)*

Teacher: *Thank you. Now, everyone turn to page 48.* (3)

Students find page 48.

Teacher: *Yesterday we were discussing the photograph on this page. If I remember correctly, we were saying that the pyramids shown indicate that the pre-Hispanic civilization was quite advanced. Sally, tell us how the photograph indicated this to us.* (4)

Sally: *The size of the stones used in the construction.* (b)

Teacher: *Explain how you can use the photograph to show us what you mean.* (5)

Sally: *The stones are so large* (points to the stones) *it took some mechanical equipment, maybe levers and pulleys, to move and lift them. I guess some mathematics had to be used to do this too.* (c)

Teacher: *Are you saying that because these early people knew mathematics and used simple machines, this indicates they were quite advanced?* (6)

Sally: *Yes.* (d)

Teacher: *Ken, tell what else we learned from the photograph.* (7)

Ken: *We thought the people knew something about stars and planets.* (e)

Teacher: *Explain what indicated this to us.* (8)

Ken: *The pyramids are called the sun and moon pyramids, and they are built to face in certain directions.* (f)

Teacher: *And what about their ability to design things, Paul?* (9)

Paul: *They were pretty good artists. You can see the carvings and paintings on their buildings.* (g)

Teacher: *That's fine. This helps us remember some of the things we were talking about yesterday. At the end of yesterday's lesson, we had some questions we wanted to get more information about. One question was, "How long ago did these people live in this part of Mexico?" Did anyone find an answer?* (10)

Hands are raised.

*Letters used in Workshop Q.

Teacher: *Nancy, tell us what you found concerning when these people lived.* (11)

Nancy: *I checked two sources, and scientists aren't sure how old the civilization was. They do know that the civilization had disappeared from the area before the Aztecs arrived about 2000 years ago.* (h)

Teacher: *What do you mean by disappeared?* (12)

Nancy: *They left the area without any trace. There are no signs that people were killed or died of sickness. They left all their buildings and things, but the people vanished.* (i)

Teacher: *How did your references account for the disappearance?* (13)

Nancy: *One book said that there might have been a volcanic eruption nearby that ruined their fields so they couldn't grow anything. This forced the people to move away.* (j)

Teacher: *What reference sources did you use?* (14)

Nancy: The World Book Encyclopaedia *and our social studies book on Mexico.* (k)

Teacher: *Did anyone else find other information on this question?* (15)

Hands are raised. Teacher points to Dave.

Dave: *I checked the* Encyclopaedia Britannica, *and it said the same thing.* (l)

Teacher: *Scientists don't seem to know when the civilization existed, but they do know some things about how they lived. Although we haven't read about this yet, how do you think most people made a living in this civilization?* (16)

Tom: *Most people grew food. They were farmers.* (m)

Henry: *Many of them made things. They carved wood, they wove blankets, and they made pottery.* (n)

John: *They had big market places where they would trade the things they made and grew.* (o)

Teacher: *Their life was certainly different from ours today. Suppose you could live in those early times. Based upon what you know, what do you think the life would be like for you?* (17)

Paul: *I wouldn't have liked it. It would have been too much hard work.* (p)

Dave: *There wouldn't be any school because you would probably have to help grow and make things.* (q)

Teacher: *Who would teach you how to do this if there were no schools?* (18)

Dave: *You would learn from your parents and family. Your home would be your school.* (r)

Teacher: *What are some of the things you might enjoy doing?* (19)

Phil: *I think it would be fun to visit the market places, and I like to make things so I think it would be fun to make things to take to the market.* (s)

Teacher: *Can you name some other civilizations we have studied that are similar to this one?* (20)

The class continues...

End of Transcript

If you would like to compare your identification of the questions with the identifications made by others, turn the page.

Analysis of Transcript (1)

(1) Non-instructional (Procedural). No verbal response is expected. Also, the statement does not pertain to the lesson, but simply is preparatory in getting the lesson started

(2) Confirming. Tells the student to recall information.

(3) Non-instructional (Procedural). No response is expected.

(4) Confirming. Tells the student to remember what was discussed earlier.

(5) Integrating. Directs the student to utilize the photograph to clarify her statement in her own terms, synthesizing information previously learned.

(6) Integrating. The teacher has rephrased ideas of the student and asks the student if they have been rephrased properly to focus upon the student's idea.

(7) Confirming. Directs student to recall earlier information.

(8) Confirming. Directs student to give a more precise recall.

(9) Confirming. The teacher is cluing the students toward remembering other previously discussed information.

(10) Non-instructional. Question does not develop students' thinking on the topic but is simply used to obtain information that indicates which students can be called upon.

(11) Confirming. This statement continues to converge on the topic and the student can state what she learned in her own words.

(12) Integrating. Asks for clarification in the student's terms.

(13) Confirming. This question continues to converge on the topic, asking the student to remember what she read.

(14) Confirming.

(15) Non-instructional. Question is used as an indicator, as in 10 above.

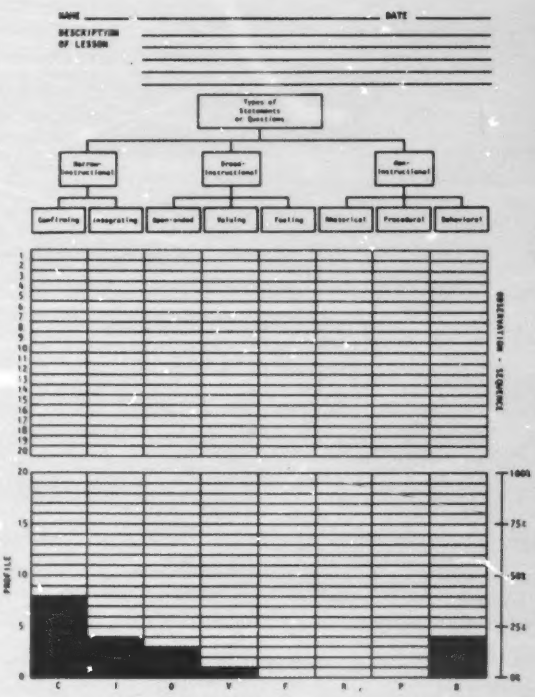
(16) Open-ended. Students have not yet studied this topic, thus, any response should be acceptable.

(17) Open-ended. Asks students to express their ideas and speculate about a situation.

(18) Open-ended. There is no indication that a specific response is expected. The teacher will accept whatever the student says.

(19) Valuing. Asks for students to express their preference.

(20) Integrating. Asks for comparison.



Here are some questions to discuss with colleagues:

1. What evidence is there that the teacher met or did not meet his/her goals in the transcript lesson?
2. How did the types of statements and questions contribute to the lesson?

WORKSHOP E
classifying statements and questions from a transcript (2)

The purpose of this self-workshop is to provide you with additional transcript material for practice.

If you would like more practice in identifying and classifying written directive statements and eliciting questions, the transcript on the next two pages can be used.

A numeral is placed after each statement and question asked by the imaginary teacher. Identify the numbered statements and questions on one of the assessment sheets found at the back of this book, then tally the types on the graph to obtain a profile of them.

Description of Setting From Which Transcript Was Made

Setting: A conversation between a teacher and several students

Topic: The teacher is trying to find out what the students know and how the students feel about cities.

Beginning of Transcript

Teacher: *When someone says the word "city" to you, what do you think of?* (1)

Bill: *Buildings, movie stars, and lovely flowers.* (a)*

Teacher: *How does a city smell to you?* (2)

Mary: *Well, it smells very pretty, but if it gets polluted it smells polluted.* (b)

Teacher: *Explain what a polluted city is.* (3)

Mary: *It's where everybody just throws their trash around and throws ugly beer cans and wine bottles all over the city. They throw out their dirty trash and everything.* (c)

Teacher: *So you think a city is polluted when there's a whole bunch of trash around?* (4)

Mary: *Yeah.* (d)

Teacher: *What other things do you think about when you say "city?"* (5— no pause) *Can you touch a city?* (6)

Dave: *Yes, you can.* (e)

Teacher: *Tell us how.* (7)

Dave: *By just putting your hand down there and touching it.* (f)

Teacher: *What does a city feel like when you touch it?* (8)

Dave: *Kinda rough.* (g)

Teacher: *Explain what "kind of rough" means.* (9)

Dave: *It doesn't feel soft because the buildings are made rough on the outside and smooth on the inside.* (h)

Teacher: *Rich, what city are you from?* (10— no pause) *What cities are you familiar with?* (11)

Rich: *I've been in Santa Monica, Concord, and Las Vegas.* (i)

Teacher: *Are those cities different in any way?* (12)

Rich: *Las Vegas is very different.* (j)

Teacher: *Explain how it is different.* (13)

Rich: *Las Vegas is much prettier.* (k)

Teacher: *Tell me what you mean by "prettier."* (14)

Rich: *There's not much trash around and there are bright lights at nighttime. You go down the street and see all these lights. They are so pretty you want to smile, and I do.* (l)

Teacher: *In what city were you born?* (15)

Rich: *Santa Monica.* (m)

Teacher: *Where is Santa Monica?* (16)

Rich: *I don't know.* (n)

Teacher: *Tell how Santa Monica is different from Las Vegas.* (17)

Rich: *Santa Monica has a beach. I wish Santa Monica's beach was in Las Vegas.* (o)

*Letters used later in Workshop Q.

Teacher: *Are you saying that you like Las Vegas more than you like Santa Monica?* (18)
Rich: *Yes.* (p)
Teacher: *How long did you live in Santa Monica?* (19)
Rich: *About 10 years. We've only lived here a year. I'm 11 now.* (q)
Teacher: *How long did you live in Las Vegas?* (20)
Rich: *I never lived in Las Vegas. We just visited there last summer.* (r)

End of Transcript

To compare your identification of questions with the identification made by others, turn the page.

Analysis of Transcript (2)

(1) Open-ended. Invites free exploration.

(2) Valuing. Asks student to make a judgment.

(3) Integrating (or open). Directs student to explain her response to the preceding question.

(4) Integrating. The teacher has rephrased the student's ideas and asks the student if they have been rephrased properly to focus upon the student's ideas.

(5) Non-instructional. Not enough time is given for the student to respond.

(6) Open-ended. Invites free exploration.

(7) Open-ended. An extension of question 6.

(8) Valuing. Asks student to make a judgment though student may have interpreted it as open-ended.

(9) Integrating. Teacher gives no indication that he/she wants a predetermined definition and tells the student to clarify the preceding response.

(10) Non-instructional. Not enough time is given for reply.

(11) Confirming.

(12) Open-ended. Asks for free exploration; no particular answer is expected.

(13) Integrating. Directs student to clarify the preceding response.

(14) Integrating. Tells student to explain his criteria for response to the preceding question.

(15) Confirming.

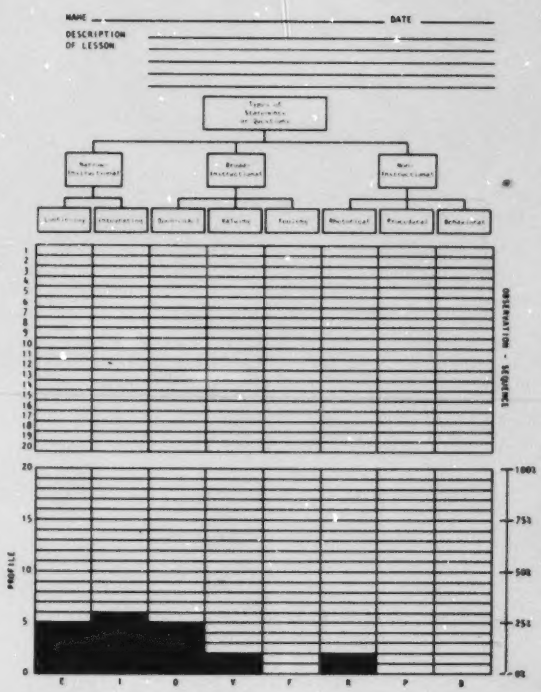
(16) Confirming.

(17) Open-ended. Similar to question 12.

(18) Integrating. Teacher is rephrasing the student's idea. In rephrasing, there is a check on a value statement. Thus this question might also be classified as a valuing question.

(19) Confirming.

(20) Confirming.



Here are some questions to discuss with colleagues:

1. When is a profile, like the one made for these questions, appropriate?
2. How might the statements and questions of the teacher be improved?

WORKSHOP F
classifying questions from an audiotape (1)*

The purpose of this workshop is to provide you with the means to practice identifying and classifying questions from an audiotape. Following this workshop, you will be able to identify and classify types of questions contained on an audiotape.

This self-checking experience is similar to those in the two preceding workshops. The main difference is that the audiotape has captured two additional dimensions of classroom interaction: the inflections of the speakers and the teacher's pauses that allow student responses.

As you listen to the interaction on the audiotape, classify each question you hear and record it on one of the assessment sheets at the back of this book. When this is done, construct a profile of the interaction.

Analysis of the questions is on the next page. You might like to check the way you classified the questions against the way experienced teachers classified them.

*Audiotape available through Educational Research and Applications Corporation.

Analysis of Audiotape (1) Questions

(1) "*Does anybody have any ideas on theories about how this thing works, maybe?*" Open-ended. Student is asked to explore a problem, with minimal guidance.

(2) "*Can you think of a way we might gather some data to find out whether there's a vacuum inside or not?*" Open-ended. Student is asked to generate ideas on his own.

(3) "*Understand what he's saying?*" Non-instructional. Not directly related to the content of the lesson, i.e. student is not asked to recall, deduce, synthesize, evaluate, etc.

(4) "*What would you expect to happen?*" Open-ended. Asks student to make a predication without clues or guidance.

(5) "*And then what happens?*" Open-ended. Asks student to repeat part of the hypothesis that he generated in response to open-ended question #1.

(6) "*How could we find out?*" Non-instructional. Not enough time allowed for response.

(7) "*What data do we need to know about to test your theory out?*" Non-instructional. Not enough time allowed for response.

(8) "*What's something you need to know?*" Open-ended. No specific response is expected.

(9) "*How could you find out if the gas floats?*" Open-ended. Asks student to generate a solution to a problem.

(10) "*You're doing an experiment in your head, aren't you, in this case?*" Non-instructional. No answer is expected.

(11) "*Now does that tell you that this gas is heavier than air?*" Integrating. Asks students to analyze and interpret the data (balloon filled with gas would sink). (One tipoff that this is an integrating question— there is one correct answer, but the question doesn't ask for recall or recognition of information.)

(12) "*What would happen if I were to fill a balloon with hydrogen gas?*" Confirming. Asks students to recall from previous experience.

(13) "*You still don't know whether it's lighter or heavier than air, though, do you?*" Non-instructional. No answer is expected.

(14) "*Now the fact that you observe the flame here and the gas is coming out tells you that maybe it's a little lighter than air, isn't it?*" Non-instructional. No answer is expected.

(15) "*Any other?*" Open-ended. Repeat of the original open-ended question (#1).

(16) "*Do you understand what he's saying on this?*" Non-instructional. No time allowed for response and not directly related to the content of the discussion.

(17) "*What's in air?*" Non-instructional. Not enough time allowed for response.

(18) "*What's the main gas that's in air?*" Confirming. Asks students to recall information.

(19) "*How many vote nitrogen?*" Confirming.

An extension of question #18.

(20) "*How many vote oxygen?*" Confirming. An extension of question #18.

WORKSHOP G
classifying questions from an audiotape (2)*

The purpose of this workshop is to provide you with additional audiotape material for further practice.

If you decide you would like more practice in identifying and classifying questions, you can use the second interaction that is recorded on the audiotape.

As you listen to the interaction on the audiotape, classify each question you hear and record it on one of the assessment sheets at the back of this book. When this is done, construct a profile of the interaction.

An analysis of the questions is given on the next page.

*Audiotape available through Educational Research and Applications Corporation.

Analysis of Audiotape (2) Questions

(1) "*Where is that triangle form?*" Confirming. Asks student to recognize information.

(2) "*Anything else about the picture that Patty's made?*" Open-ended. Asks student to explore freely.

(3) "*How about the size of her shape?*" Integrating. Converges; asks student to develop an idea about a certain aspect (size) of the picture.

(4) "*What?*" Non-instructional. Unrelated to content. Asks student to repeat because the teacher didn't hear the reply the first time.

(5) "*What is it then?*" Open-ended. Free exploration; any response would be acceptable.

(6) "*Why does it look like a boat?*" Open-ended. Same as 5.

(7) "*Or when Patty had it turned this way, there were what?*" Open-ended. Same as 5.

(8) "*Have you seen a lot of leaves before?*" Confirming. Asks student to recall information from his own experience.

(9) "*And a lot of sails?*" Confirming. Same as 8.

(10) "*Is there one thing you notice about leaves all on the same tree?*" Integrating. The teacher has in mind an idea that she wants the student to come up with.

(11) "*And how about the sides, when the stem that runs down the middle of the leaf and then the little veins on each side?*" Integrating. Teacher gives more clues to the idea she wants developed.

(12) "*Have you seen those, have you noticed those?*" Confirming. Asks for information from the student's experience.

(13) "*Have you noticed anything about the relationship of one side to another side?*" Non-instructional. No time allowed for response.

(14) "*Like Patty's this side, her petals, to this side, of her leaves to these leaves?*" Integrating. Extension of questions 10 and 11. More clues are given.

(15) "*Do you know a word for something that's the same size and the same shape?*" Confirming. Asks student to recall a word.

(16) "*Ever hear of that word, symmetrical?*" Confirming. Asks student to recall experience.

WORKSHOP H
assessing statement or questioning strategies

The purpose of this workshop is to help you transfer your knowledge about statements and questions and your skill in identifying them in such a way that the knowledge and skill become a useful tool in your own analysis of your instruction. Following several practice sessions guided by this workshop, you will be able to assess your own instructional statement or questioning strategies.

Make one or more audiotape recordings of instructional sessions where you are deliberately using statements or questions. The interactions you record can be done with any size group of students.

Select a five- to ten-minute segment from each recording (long enough to contain about twenty statements or questions), identify and classify your statements or questions on one of the assessment sheets at the back of this book, then construct a profile.

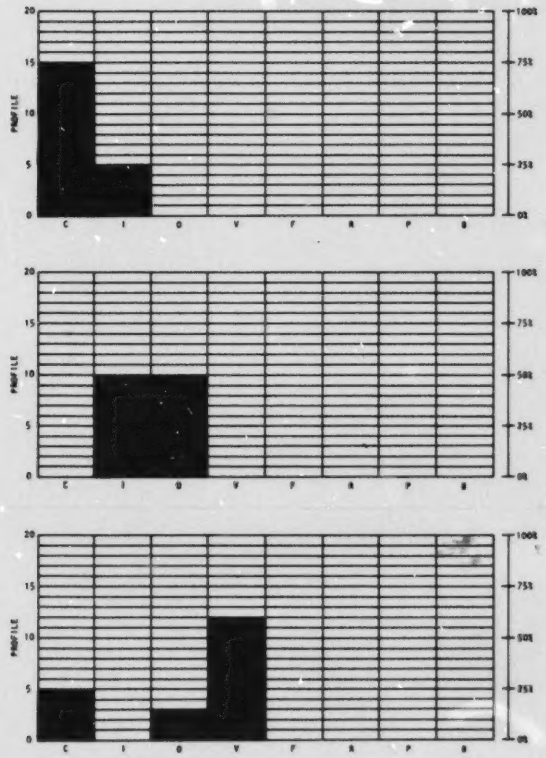
When finished, ask yourself a few questions about the statements or questions you used during your lesson:

1. In what ways did the types of statements or questions I used contribute to achieving the purpose of the lesson?
2. Were my statements or questions all of one type or did I use a variety of them? What percentage was there of each type?
3. Were the students' responses to integrating statements or questions as I predicted? Were the students' responses to open-ended statements or questions divergent?

WORKSHOP I
matching strategies to instructional profiles

The purpose of this workshop is to provide you with more practice ideas.

Shown below are three different profiles from three different lessons given by teachers. Select one or more of the profiles and deliberately try to incorporate a series of statements or questions in an instructional setting to match the profiles. Audiotape your attempt, then use one of the assessment sheets at the back of this book to check yourself.



Some questions to ask yourself:

1. In what way was the profile I selected to try, appropriate to the lesson I taught?
2. Was I capable of asking particular types of questions when I wanted to?

WORKSHOP J
matching goals to questions

The purpose of this workshop is to give you the opportunity to relate types of questions to instructional goals. After this workshop, you will be able to judge the value of questions in terms of their effects upon students' thinking.

Listed below are three questions asked by teachers in particular instructional situations. It is impossible to really know each teacher's reasons for using a particular question, but it is possible for you to speculate on the reasons.

Use your careful judgment to answer each of the questions below. On the following page you can compare your perceptions to those of experienced teachers.

1. Following an assignment which required students to read about the life of Einstein, the teacher asks: "*In what year was Einstein born?*" What type of question was asked? For what outcome in students' thinking might the teacher ask this question?

2. Upon returning from a field trip to a zoo, the students are asked: "*What were some of the animals you saw?*" What type of question was asked? For what reasons related to thinking might the teacher ask this question?

3. Following a film on migratory birds, the teacher asks the students: "*What are the major factors influencing migratory paths?*" What type of question was asked? For what reasons or goals related to students' thinking might the teacher ask such a question?

Analysis of Questions Related to Students' Thinking

Listed below are some possible interpretations that might be given concerning the questions listed on the previous page.

1. This question is narrow and requests direct information that will match an expected response. The student is expected to recall specific factual information that the teacher has in mind. (The student will do some convergent thinking.) In addition to this outcome in a student's thinking, the teacher might have sought to find out if the student read the assignment.

2. This question asks the student to recall information. Although the teacher does not give any indication that a particular answer is sought, the student is expected to name or describe animals from the set of zoo animals seen. The teacher might also be seeking information on the general range of observations made by students while at the zoo.

3. This question is narrow and asks the student to focus upon a particular part of the film just seen. The student is expected to identify and describe factors that the teacher probably has in mind, but the student can integrate the information and state it in his or her own terms.

WORKSHOP **K**

classifying statements or questions using your own audio- or videotape

The purpose of this workshop is to help you transfer your knowledge about statements and questions and your skill in identifying them so that they become a useful tool in your own analysis of your instruction. Following several practice sessions, you will be able to assess your own instructional strategies.

Make an audio- or videotape of a session where you are deliberately using statements or questions. The interaction you record could be with any size group of students.

Select a five- to ten-minute segment of this tape (long enough to contain about twenty statements or questions), categorize your statements or questions on one of the assessment sheets at the back of this book, and construct a profile of your lesson.

WORKSHOP L
sequencing questions strategically

The purpose of this workshop is to help you further your ability to use questions effectively. After this workshop, you will be able to consciously sequence questions to move students toward convergent or divergent thinking.

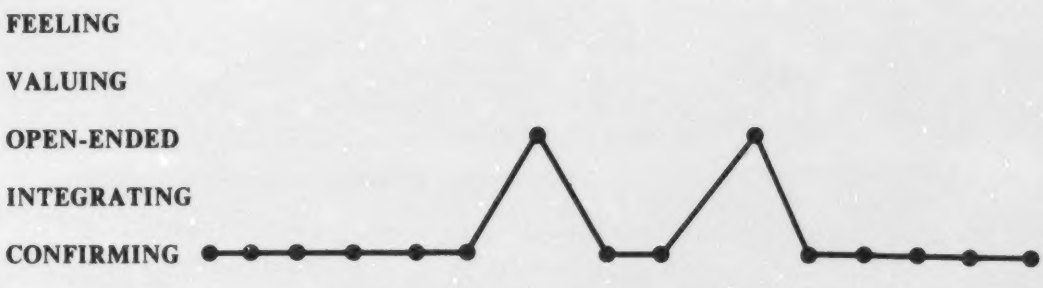
It is possible to influence the quality and direction of student thinking using questioning strategies. This can be done by consciously shifting the types of questions so as to move students from convergent to divergent or divergent to convergent thinking when appropriate.

In the examples below, consciously shift the emphasis on thinking as indicated. You might discuss your strategies with colleagues.

1. Suppose your goal was to have students do more open-ended thinking. Starting with the narrow, recall question below, list a sequence of questions that will move students toward your goal.
   a. *"When was the Declaration of Independence signed?"*
   b. _____
   c. _____
   d. _____
   e. _____
2. Following the narrow, integrating question below, list a sequence of questions that will move students toward thinking in terms of values.
   a. *"What similarities are there between motorcycles and bicycles?"*
   b. _____
   c. _____
   d. _____
   e. _____
3. Suppose you had started a discussion with an open-ended question but found the students responding in vague and very general terms. You decide to shift them toward more specific thinking. List a sequence of questions that will move students toward such thinking.
   a. *"What are some variables that must be controlled if you want to see how long a pendulum will swing?"*
   b. _____
   c. _____
   d. _____
   e. _____

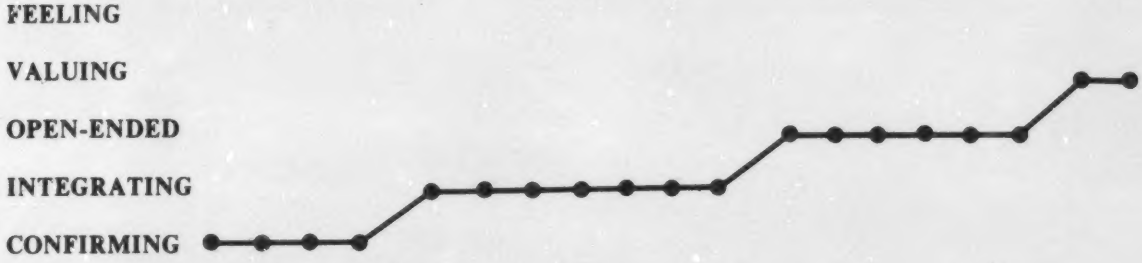
It has been found that when questions or statements are given sequentially with some thoughtful purpose behind the sequence, the questions or statements help students derive more meaning than when they are given in a random order or if they are all of one type. The way most people ask questions or give statements could be tracked in one of the following two ways.

Random Order



Primarily One Type

There are several ways to use questions or statements more effectively. For example, one way is to start with confirming questions, letting students recall information and make basic observations. Then after ample data have been gathered, raise the level of the students' thinking by shifting to integrating questions, letting students make comparisons and seek relationships. Toward the end of your lesson you might raise the level of thinking higher by asking open-ended questions, letting students generalize or hypothesize. The questions asked in this way would look like this if they were tracked.



Questions could also be used to strategically develop expressions of feelings or attitudes. Another planned strategy might begin very open-ended and finish upon specific details through confirming questions or statements.

The choice of how questions or statements are used is in your hands. To use them effectively takes some practice. This workshop has provided you with all the means and methods for you to proceed independently and at your own pace in the development of this skill.

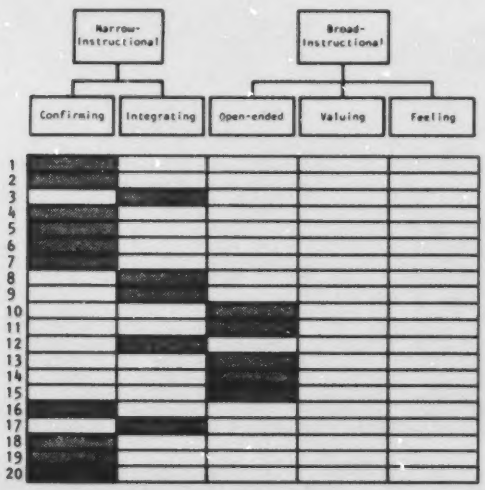
WORKSHOP M
using statements and questions strategically

The purpose of this workshop is to help you further your ability to use statements and questions effectively. Following this workshop, you will be able to purposefully move students toward convergent and divergent thinking in instructional settings.

In your classroom, practice sequencing statements or questions to move students from narrow thinking to broader thinking and vice versa. Do this with specific reasons in mind.

Audio- or videotape yourself to see how well you can do this. An analysis of your skill to sequence statements and questions related to students' thinking can be made by examining the observation sequence section on your personal assessment sheet. In the example below, it can be noted that the teacher moved students from thinking convergently to thinking divergently, then back again.

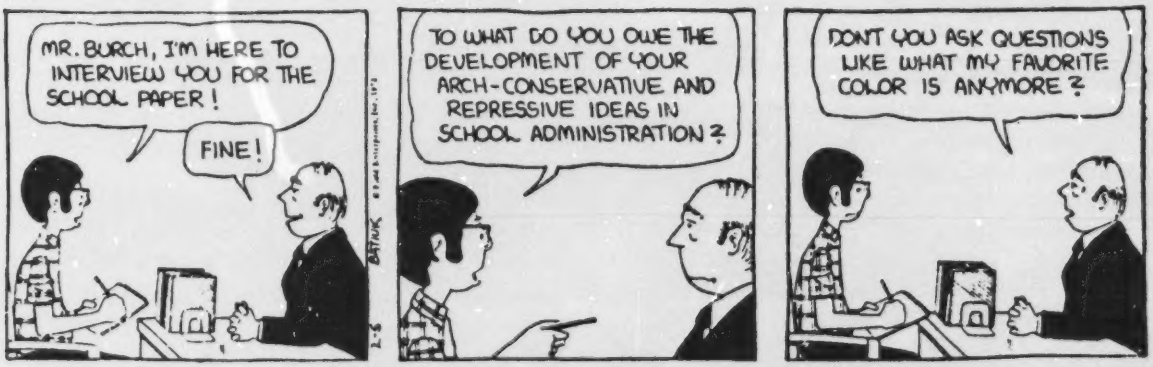
When practicing, always be sure your practice is appropriate to the lesson.



Now try to identify the types of questions written in each of the following comic strips.

FUNKY WINKERBEAN — By Tom Batiuk

FUNKY WINKERBEAN — By Tom Batiuk


MR. BURCH, I'M HERE TO INTERVIEW YOU FOR THE SCHOOL PAPER!
FINE!
TO WHAT DO YOU OWE THE DEVELOPMENT OF YOUR ARCH-CONSERVATIVE AND REPRESSIVE IDEAS IN SCHOOL ADMINISTRATION?
DON'T YOU ASK QUESTIONS LIKE WHAT MY FAVORITE COLOR IS ANYMORE?

B.C. — By Johnny Hart

I DON'T SUPPOSE ANY OF YOU HAVE HEARD OF THE PYTHAGOREAN THEOREM?
PETER'S MATH CLASS...
IF YOU MEAN ABOUT THE SQUARE OF THE HYPOTENUSE BEING EQUAL TO THE SUM OF THE SQUARES OF THE OTHER TWO SIDES,..... I HAVE!...
PETER'S
YOU MAY GO CLAP THE ERASERS.
PETER'S MATH CLASS

By permission of John Hart & Field Enterprises, Inc.

WORKSHOP N
matching types of statements and questions to learning processes

The purpose of this workshop is to extend what you know about statements and questions. Following this workshop, you will be able to match types of questions to specific learning processes.

Certain teacher-initiated statements and questions can be used to elicit specific learning responses on the part of students. For example, a narrow, confirming question might guide the student into observing to obtain information, as with the question: "*What color is this?*"

Listed below are seven thinking/doing learning processes. These are useful to keep in mind no matter what subject you are teaching.

Observing:	includes seeing, hearing, feeling, tasting, smelling, receiving.
Communicating:	includes verbal, non-verbal, written, and pictorial communication.
Comparing:	includes equating and making comparisons, both qualitative and quantitative.
Organizing:	includes classifying, grouping, ordering, sequencing, seriating, and sorting.
Experimenting:	includes formulating experimental hypotheses, controlling and manipulating variables, and relating space-time measurements.
Inferring:	includes synthesizing, abstracting, analyzing, recognizing patterns, predicting, generalizing, formulating explanatory models, and theorizing.
Applying:	includes using knowledge, choosing, and inventing.

The sequence of the thinking/doing learning processes roughly follows a range from simple to complex, from concrete to abstract, from concrete to formal operational thinking.

Now use the chart on the next page and try to match a statement or question for each of the thinking/doing learning processes. A few have been done to get you started.

Learning Processes	Types of Statements or Questions				
	Confirming	Integrating	Open-ended	Valuing	Feeling
Observing	*"What color is it?"*	*"What color would best protect this animal in this environment?"*	*"What do you see?"*	*"Why would or why wouldn't these colors be attractive to you?"*	*"How do these colors make you feel?"*
Communicating	*"How would you describe the zebra's coloration?"*		*"What do you mean by...?"*		
Comparing	*"Which is larger?"*				
Organizing				*"Explain why you think this is the best order for arranging these objects."*	*"Tell me how this arrangement of colors makes you feel."*
Experimenting		*"Identify the dependent variables in this design."*			
Inferring		*"State a rule that explains what we observed."*	*"Tell what possibility might take place if you..."*		
Applying	*"Using the materials I gave you, how would you make...?"*				

WORKSHOP O
practicing statement and questioning strategies

The purpose of this workshop is to help you transfer to classroom operation that which you have learned about statement and questioning strategies and their relationships to specific learning processes. Your ability to do this will depend upon your practice.

Review different strategies (Workshops L and M), then select a learning process (Workshop N) that you think is important to one or more of your students. Next, audio- or videotape yourself as you deliberately sequence your statements or questions to achieve the goal you selected.

After assessing your tape, decide whether or not you need more practice. See how expert you can become with this instructional skill.

WORKSHOP P
identifying types of student responses to teacher-initiated statements and questions

The purpose of this workshop is to describe different ways of classifying student responses to teacher-initiated statements and questions. Following this workshop you will be able to identify different types of student responses.

Student responses to statements or questions may be classified according to the thinking processes utilized. For example, responses may be based on memory, a synthesis of information, or synthesis and expression of the student's ideas and feelings.

Student responses may be convergent and predictable— what the teacher had in mind. Or student responses may be divergent and unpredictable.

Student responses may also be classified as to whether they are correct or incorrect or whether the correctness of the response is irrelevant.

An analysis of student responses to your statements or questions may provide an indication of whether or not the intent of your strategy has been accomplished.

On the following pages, types of student responses are described in terms of the thinking processes required, the predictability of the response, and the correctness of the response.

1. Recall Responses

Recall responses are based on the student's remembering or recognizing information. Recall responses are generally predictable and are limited to a single or restricted set of convergent possibilities.

Recall responses may be in a rote form— where the information is stated verbatim. Or recall responses may be phrased in the student's own words.

The student may remember or recognize the information correctly or incorrectly. Or the student may give a response indicating that he/she does not remember.

Examples:

"3 + 14 = 17."

"Oxygen is the most important component of air for humans."

"Yesterday at the animal farm we saw rabbits and chickens and cows and goats and pigs."

"I don't know."

Recall responses are anticipated in response to the teacher's confirming statements and questions.

2. Integrating Responses

Integrating responses are based on the student's synthesizing information and ideas in his/her own words.

There are two types of integrating responses. Some integrating responses are convergent and predictable. Other integrating responses are divergent and unpredictable.

a. Convergent Integrating Responses

Convergent integrating responses are replies in which the student synthesizes information in a manner that the teacher has intended— from a limited set of predictable possibilities.

The student may synthesize the information either correctly or incorrectly.

Examples:

"It will just balance— if you add a weight of that size to the other side of the scale."

"The number of pieces you break it into doesn't make any difference to the water level."

Convergent integrating responses are anticipated in response to the teacher's integrating statements or questions. When a student responds by synthesizing information in the intended manner, it is generally an indication that the integrating statement or question has achieved its purpose.

When a student synthesizes the information in an incorrect manner and responds with a "wrong" response, attention needs to be paid to whether the wrong cues were emphasized in the process or whether the student lacks some prerequisite information.

However, when a convergent (predictable) response is the reply to a statement or question that was intended to be open-ended, the teacher needs to give further attention to how the statement or question was phrased, the place in the sequence of statements and questions, or to other factors that may have prevented a particular student from responding in a divergent manner.

b. Divergent Integrating Responses

Divergent integrating responses are those replies where the student synthesizes information or ideas in new and unpredictable directions.

Divergent integrating responses are neither "right" or "wrong." The correctness of the response is irrelevant.

Examples:

"I think that the author should have summarized the meaning of the first two stanzas in the third stanza."

"If we superimposed the first graph on top of the second instead of putting one under the other, we could make the comparison more easily."

Divergent integrating responses are anticipated in response to open-ended statements and questions.

3. Expressive Responses

Expressive responses are based on the student's own opinions, attitudes, and feelings (rather than ideas) and cannot be predicted ahead of time. Expressive responses are not concerned with the correctness of the reply.

There are two types of expressive responses: opinion responses and feeling responses.

a. Opinion responses

Opinion responses are replies in which the student synthesizes information on a cognitive level and expresses a judgment about the topic. In expressing an opinion or attitude, the student may also be influenced by his or her feeling about the subject.

Examples:

"I think that the second order is better because it more logically follows."

"I believe that the government's decision in this matter is short-sighted."

Opinion responses are anticipated following valuing statements and questions.

b. Feeling responses

Feeling responses are those in which the student expresses how he or she feels— in the affective, emotional sense.

When a student is expressing his or her own feelings, there can be no right or wrong replies.

Examples:

"The part about the dead bird made me feel sad."

"I really felt very sorry for the little girl in the movie..."

"Boy, was I glad when that experiment came out the way I predicted!"

Feeling responses would be expected to follow feeling statements and questions.

The following chart summarizes the attributes of (1) predictability, (2) form— rote or own words—, and (3) correctness of the major forms of student responses to teacher statements and questions. Fill in the blank headings of the columns to indicate the types of student responses described on the preceding pages.

Types of Student Responses					
Predictability	Predictable	Predictable	Unpredictable	Unpredictable	Unpredictable
Form	Rote or Own Words	Own Words	Own Words	Own Words	Own Words
Correctness	Correct or Incorrect	Correct or Incorrect	Inapplicable	Inapplicable	Inapplicable

In considering the effectiveness of statement and questioning strategies, it is useful to determine whether the student response was of the type anticipated for the particular question.

Certain types of responses are anticipated for different types of statements and questions.

On the form below, fill in the type of student response expected for each type.

Type of Statement or Question	**Type of Student Response Anticipated**
Confirming	
Integrating	
Open-ended	
Valuing	
Feeling	

WORKSHOP Q
classifying student responses from transcripts

The purpose of this workshop is to provide you with a means to practice identifying and classifying student responses from a transcript. Following this workshop, you will be able to identify and classify types of student responses contained in a written transcript.

Reread Transcripts 1 and 2 in Workshops D and E. In the spaces below, identify the types of thinking used by students in responding to the teacher's questions. Note that letters rather than numerals are used to identify responses in the transcripts (see answer to letter *a* in Transcript 1). Compare your analyses to those given on the following pages.

Transcript (1)	
Response	Type of Student Response
a	
b	
c	
d	
e	
f	
g	
h	
i	
j	
k	
l	
m	
n	
o	
p	
q	
r	
s	

Transcript (2)	
Response	Type of Student Response
a	
b	
c	
d	
e	
f	
g	
h	
i	
j	
k	
l	
m	
n	
o	
p	
q	
r	

Analysis of Transcript (1) [From Workshop D]
Student Responses

(a) Recall. [following question #(2)]

(b) Recall. [following question #(4)]

(c) Convergent. Student seems to be doing some synthesis of information to come up with one of a set of responses the teacher probably had in mind, although she may also have added a divergent idea in the last sentence. [(6)]

(d) Convergent. Student is confirming teacher's interpretation of her largely convergent response.

(e) Recall.

(f) Recall.

(g) Recall.

(h) Convergent. Student reports her findings which probably are a part of the information that the teacher had anticipated. [(11)]

(i) Convergent. Probably more reporting of information read rather than her own ideas.

(j) Recall.

(k) Recall.

(l) Recall. Student recognizes information given as same as he read.

(m) Divergent. Students are probably putting information together in ways that are new to them. The correctness of the response is irrelevant.

(n) Divergent. "

(o) Divergent. "

(p) Feeling and Opinion. Student gives how he would feel and his opinion as to why. [(17)]

(q) Divergent. Student gives unpredictable response, based on own ideas.

(r) Divergent. "

(s) Opinion. Student tells his opinion of what he would like.

Analysis of Transcript (2) [From Workshop E]
Student Responses

(a) Divergent. Unpredictable response.

(b) Divergent. Unpredictable response.

(c) Convergent. Student synthesizes information to come up with a definition.

(d) Convergent. Student confirms teacher's interpretation of his response.

(e) Convergent. (Or recall, if student is remembering that cities can be touched.)

(f) Convergent. Student synthesizes information to elaborate on previous response.

(g) Divergent. No right or wrong answer.

(h) Divergent. Student elaborates on his own idea.

(i) Recall.

(j) Convergent. Student synthesizes information to make comparison.

(k) Opinion.

(l) Divergent and Feeling. Student gives ideas about opinion then continues to state how it feels.

(m) Recall.

(n) Recall.

(o) Convergent and Opinion. Student synthesizes information to make comparison then expresses attitude.

(p) Opinion.

(q) Recall.

(r) Recall.

WORKSHOP R
analyzing the length of student responses to teacher questions

The purpose of this workshop is to consider the length of student responses to teacher questions.

Student responses to teacher questions vary in length from simple one-word replies to an extensive elaboration of ideas.

The length of student responses can be classified as to whether it is brief or elaborated.

All types of responses to teacher questions may be either brief or elaborated.

a. Brief responses

There are two types of brief responses:

1. "Yes"— "No" responses
2. Single idea responses which are expressed through a few words or in a single sentence.

Examples:

"Do you know what color fire engines are?"

"Yes."

"Fire engines are red."

"Do you mean that you think that the more pieces there are the more it will weigh?"

"Yes."

"That one will weigh more."

"What would be a better way to do it?"

"I don't know."

"The same way you did it yesterday."

b. Elaborated responses

Elaborated responses are those where either (1) several ideas are expressed or (2) a single idea is expanded and described in greater detail.

Example:

"What would be a better way to do it?"

"If you take this pulley and raise it to the height of the window and move that pulley over to the right side I think it will move more smoothly."

Listen to one of your recordings of a classroom lesson. Analyze the responses students gave in terms of the length of their sentences.

You may want to consider whether your students respond with brief or elaborated statements. If your students seem to be giving many brief responses, it may reflect the purpose of your lesson. On the other hand, a high percentage of brief responses may be an indication of the type or timing of questions and eliciting statements. You may want to ask yourself whether you are allowing the student enough time to elaborate spontaneously on his or her ideas or whether you convey the attitude that you really want to hear what he or she has to say. Or perhaps it is certain students who give brief responses— as if to get their "turn" over with. For some students and in some classes, special attention may be necessary to help individuals feel comfortable in more freely expressing their ideas and opinions. Allowing students the opportunity to develop their own ideas may be one important aspect of the learning process.

Review of Some Research on The Use of Questions in Instruction

Research on teacher-intiated directive statements is almost non-existent. There is, however, some research and much professional literature on the use of questions.

Questions that are carefully selected, properly sequenced, and asked at appropriate times have been recognized as central to the facilitation of learning since the time of Socrates (469-399 B.C.).

Socrates, one of the greatest instructors of all time, guided learning through a method of cleverly sequenced questions and conversation. To demonstrate his method, he chose at random a boy off the street. Although he had no previous knowledge of the boy's experiences, Socrates, using a series of questions, led the boy to demonstrate a geometrical theorem. Throughout history, other effective teachers have facilitated learning through the careful use of questions.

There are many articles and books written about questions, but research studies on questioning as a means of teaching, both in instructional settings and in empirical investigation, are rare. Some of the more important ones can be organized into three categories: a) questions asked by teachers in instructional settings; b) written questions; and c) the effects of questions upon learning.

1. Questions Asked by Teachers In Instructional Settings

More than half a century ago, Stevens (1912) found that four-fifths of the school day was filled with teachers' questions and students' answers. Yamada (1913) estimated that two-thirds of the instructional time at school was taken up with teachers' questions and students' answers.

Apparently the instructional situation is much the same today. Flanders (1963) reports that two-thirds of the time in classrooms is spent in talk, two-thirds of the talk is done by the teacher, and two-thirds of the teacher talk consists of direct influence such as presenting information or opinion, giving directions, and criticizing. A study by Bellack and others (1963) confirms that teacher talk accounts for approximately two-thirds of the total time spent in verbal interaction. Floyd (1960), Schreiber (1967), and Moyer (1967) indicate that teachers tend to spend most of the teacher talk time asking questions. It was found that teachers ask questions at the rate of two per minute.

Several studies have specifically focused upon measuring the frequency of various types of questions asked in classrooms. An early investigation into the role of questions in education led Stevens (1912) to note a dominant emphasis on memory questions. He suggested that teachers talk too much and generally ask questions not geared to developing students' higher cognitive functions.

In a study of secondary school teachers, Adams (1964) found that the majority of questions asked were designed to elicit only memory of factual information. In a Far West Regional Laboratory study (1967), an analysis of teachers' classroom questions showed that the student activity ratio as measured by the number of words spoken by students during taped sessions was 29%, while the teacher activity ratio was 71%. A sample of 1,347 questions was evaluated on a point system in this study. Fewer than 100 (7%) of the questions were judged capable of stimulating reflection, and only about 6% of the questions were judged likely to develop thinking. Classification of question types indicated that 42% were concerned with memory of specific facts, 23% were concerned with information of specific facts, 9% were direction giving, 8% asked for criticism or evaluation, and 3% required comparisons. The broad category of memory questions comprised 53.5% of the total number of questions.

Guszak (1967) identified six types of questions asked by teachers during reading instruction in grades 2, 4, and 6: 1) recognition questions 13.5%; 2) recall questions 56.9%; 3) translation questions .6%; 4) conjecture questions 6.5%; 5) explanation questions 7.2%; 6) evaluation questions 15.3%. Recognition and recall questions, when combined, represented nearly 70% of the questions asked by the teachers in this study.

During videotaped presentations in grades K through 3, Ruddell and Williams (1972) found that teachers used twice as many factual as interpretive questions. Of all the questions asked, 68% were at the factual level and 32% were at the interpretive level.

Lanier and Davis (1972) in a teacher-training program designed to instruct teachers in how to formulate questions, found that prior to the program, two-thirds of the questions formulated by teachers were recall questions. Following the program, the proportion of factual questions was reduced while interpretive, critical, and creative questions increased significantly.

Other studies on the frequency with which various types of questions are asked by teachers (Bartolome 1969, Davis 1967, Moriber 1972, Sloan 1966, Tinsley 1971, and Wilson 1969) also indicate that teachers rely mainly on questions that seem to be aimed at the lower levels of knowledge as described in Bloom's *Taxonomy* (1956). In these studies, memory questions or recognition and recall questions were found to account for 44% to 70% of the total questions asked.

Studies in social studies classrooms (Tinsley, Watson, and Marshall 1970) and gifted classrooms (Gallagher, Aschner, and Jenné 1967) found similar results, but in addition they found it was not possible to distinguish a gifted classroom or a process-oriented classroom on the basis of the teacher's questioning style. These findings suggest that the teaching situation does not necessarily change the style of instruction.

2. Written Questions

Pfeiffer's (1965) examination of teacher-made tests for ninth-grade social studies and Davis' (1966) analysis of the questions posed in three social studies textbooks revealed a pattern of heavy emphasis upon lower level cognitive objectives and a general neglect of higher level objectives.

Rothkopf and Bisbicos (1967) compared the effect of question placement on retention. They found that questions placed at the ends of paragraphs produced facilitative effects. Frase (1968) found that "*post questions*" produced higher general retention. The advantage existed from the first paragraph. By the way of interpretation he offered that post questions maintain pre-established reading skills rather than developing them anew.

In an earlier writing, Frase (1967) stated that "*short tests included with prose facilitate retention of specific and incidental information.*" He offered mathemagenic behaviors as an alternate to cybernetic hypotheses in which questions must occur before the reading. He noted that questions before limit while questions after optimize mathemagenic behaviors.

Morasky and Willcox (1970) investigated the relationship between question placement and the time required to process information. They found that questions before the paragraph reduced reading time.

Frase, Patrick, and Schumer (1970) found that the advantage consistently found for post questions was reduced as the motivation increased. A finding in this study that frequent questions reduce incidental learning apparently contradicts an earlier finding by Frase (1968) to the effect that increased pacing of questions favored the post question group.

Dwyer (1970) studied the effect of written questions on learning from visual materials. He had previously determined that students who were shown detailed and realistic illustrations of the human heart while listening to an audiotaped lesson on the heart did not perform as well on a criterion test as did students whose audio lesson was supplemented by simple line diagrams. Hypothesizing that the more realistic drawings contained so many details that the students had difficulty attending to those details relevant to the learning task, he repeated his experiment but, before displaying each visual, he displayed a set of questions designed to point out the most relevant details of that illustration. The students were not required to answer the questions. He found that the addition of these questions to the learning program did not improve performance on the test.

A study of written questions was made by Hunkins (1968, 1969, 1970). He prepared two different sets of written study questions and answer sheets to be used with a social studies text

in sixth-grade classes. One set contained mostly knowledge questions (87%) and the other contained more analysis and evaluation questions (48%). (NOTE: Hunkins' categories corresponded to those in Bloom's *Taxonomy.)* Eleven classes (280 students) were divided into two groups, one of which used the knowledge questions for four weeks and one of which used the higher level questions for four weeks. At the end of the study period the students took two tests, one of which was an achievement test constructed by the researcher. It contained seven questions in each of Bloom's six categories: knowledge, comprehension, application, analysis, synthesis, and evaluation. The students who had worked with higher level written questions achieved significantly higher total scores on this test than the students who had worked primarily with knowledge questions. Hunkins subsequently broke these completed tests down into six subtests, one for each category of questions. When the data were analyzed this way, he found that only for the evaluation questions on the test was there a significant difference in subscores between the two treatments. The other test taken by the students was a social studies inference test designed to measure four dimensions of critical thinking: inference, caution, overgeneralization, and discrimination. For each of these dimensions, the scores of students in the two treatment groups did not differ significantly.

The implications of the research on questioning in textbooks point to the advantage of a question position other than initial. Although the initial question may aid the reader in more effectively picking out an answer from prose, it does this at the expense of incidental learnings facilitated by questions interspersed in the narrative. A review of the research yields no information on questions which are contextual, that is, a part of the reading and not either beginning or ending it.

The mathemagenic behaviors, those which give rise to learning, offered by Frase (1968) would seem to indicate that questions offered in other than an initial position would have similar effects. Allen (1969) found that questions, memory level or higher order, at the end of a passage affect learning in a way similar to the same questions offered before the extended passage. He stated in a later writing (1970) that "*advance organizers,*" generalizations written on a higher level of abstraction than the narrative that follows, facilitate learning for higher ability students only. He also found no support for the theory that higher order questions result in greater retention of factual material

Lowery and Leonard (1976) used the above research findings and the contents of this book to develop a method for analyzing questions in the textbooks. The device, The Textbook Questioning Strategies Assessment Instrument (TQSAI), was used to analyze the four most widely used high school biology textbooks (Lowery and Leonard, 1978). The instrument makes it simple for textbook evaluation committees to analyze texts along this dimension.

It would seem that questions appearing in prose facilitate learning; that the facilitation is a result of the question's increasing the alertness of the reader; that the effect is greater for students of lesser ability and motivation; that the effect applies to the retention of both specific and incidental material; and that the optimum placement for the question is other than initiatory.

3. The Effects of Questions Upon Learning

Researchers who studied the influence of different levels of questions upon levels of students' learning and responses have obtained mixed results.

In Kleinman's study (1965), the oral questioning patterns of 23 seventh- and eight-grade science teachers were observed. From these observations Kleinman identified the three teachers who asked the most critical-thinking questions and the three who asked the fewest. A test on understanding science was given to the students of these six teachers. The results of the test led Kleinman to cautiously conclude "*that the high-ability pupils in the seventh- and eighth-grades, who have teachers that ask critical-thinking questions, have a better understanding of science, of scientists, and of methods of science than the same caliber pupils of teachers who do not ask critical thinking questions.*"

In the subject area of social studies, Buggey (1972) and Clegg and Sebolt (1970) found that students exposed to higher cognitive questions attained higher achievement scores than students who had not been exposed to such questions.

In Ladd and Anderson's (1970) study of oral questions, ninth-grade earth science teachers were each observed during pre-laboratory discussions. The researchers calculated the percentage of inquiry questions in these discussions and divided the 40 teachers into two groups: the 20 "higher inquiry" and the 20 "lower inquiry" teachers. At the end of one subject matter unit, the students in these classes took a multiple choice test on the unit. The test contained 25 low inquiry and 25 high inquiry items. The scores of students who had higher inquiry teachers were significantly higher than the scores of students who had lower inquiry teachers.

Gallagher, Aschner, and Jenné (1967) investigated the relationship between teacher questions and the thought processes of gifted junior high school students. They found that the proportion of lower and higher cognitive answers given by students depended on the proportion of lower and higher cognitive questions asked by the teachers.

After training teachers in the use of higher cognitive questions, Gall, Dunning, Galassi, and Banks (1970) found that students responded with significantly higher cognitive answers than students of untrained teachers. The cognitive levels of students' answers closely matched the cognitive levels of the teachers' questions.

Some studies provide findings that conflict with the findings of the studies previously mentioned.

Willson (1973), setting out to study the relationship between the questions of teachers and the thought levels of their pupils, found that the cognitive levels of students' answers cannot be determined simply by looking at the cognitive levels of teachers' questions.

Allen (1970), working with social studies materials, found no support for the idea that higher order questions result in greater retention of factual material.

Rogers and Davis (1970) found no effect upon achievement in the social studies as a result of the use of the teacher's higher order questions.

In studies of the relationship between verbal interaction for cognitive, procedural, social, affective, and behavioral purposes and different types of classroom structure, Marshall and Green (1976, 1979) found little use of verbal interactions of an affective nature and report that teachers tended to vary in the frequency with which they used questions in an affective context.

Summary

It seems clear that much of the average teacher's time is spent talking and that the teacher, when asking questions, does not use an extensive variety. The few types that are used tend to require students to think in terms of recall or memory. Textbooks and other written questions also perpetuate this pattern by predominantly posing recall questions. In terms of questioning patterns, most teachers and textbooks are alike.

Little is known concerning the relationship between questioning strategies and noncognitive variables, such as attitude towards learning and motivation. And although the relationship between student involvement in the learning task and achievement is becoming recognized (Gall 1973, Marshall 1977), the literature is scant on the relationship between different types of questioning strategies and student involvement in learning.

It is also clear that researchers are cautious in their statements concerning the effects of different types of questions. There is a small amount of evidence that suggests that open-ended or "higher level" questions produce better understanding. But there are also some contradictory findings concerning the effect of such questions upon retention. Most nonresearch literature favors a move toward open-ended and valuing types of questions.

This personal workshop book has introduced you to a breadth of directive statements and questioning possibilities and encourages you to learn and become skillful and flexible in using different types. The result will be that your instructional pattern, in terms of verbal statements and questions, will be significantly different from the pattern identified in most teachers. In addition, you will be able to extend the limited questions given in textbooks.

The philosophy of this program is that teachers should not necessarily use one type more than another but that their goals should be the matching of statements and questions to the immediate effect upon the learner during a lesson and that teachers give evidence of a balance among types of statements and questions.

One problem researchers have had in studying questioning has been in the identifying or training of enough teachers who can consciously use different types. With the knowledge and skill you develop through this book, you may be able to provide some valuable knowledge concerning the effect of the different questions upon students and how they learn.

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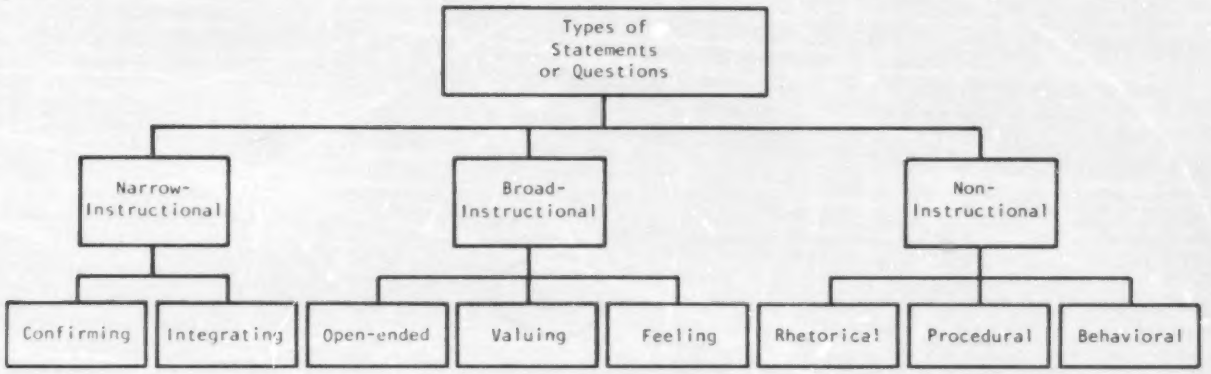

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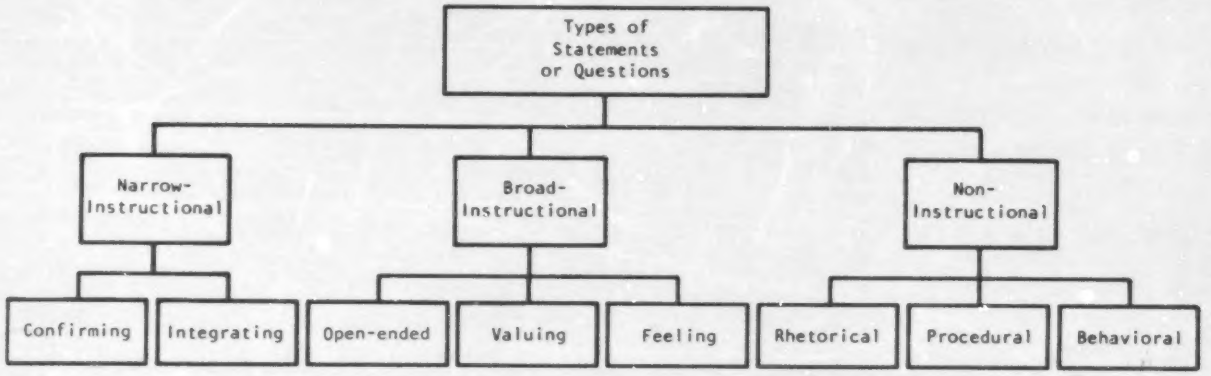

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